

WHAT IS CLAIMED IS:

1. An optical disk device, comprising:
 - 5 an optical head which emits a laser beam to an optical disk and receives a reflection light by using an objective lens, thereby carrying out one of a recording process and a reproduction process;
 - 10 a position control portion which carries out position control of at least one of the optical head and the objective lens by a compensation gain based on a detection signal from the optical head; and a disturbance learning portion which adjusts the compensation gain of the position control portion, detects disturbance information of the optical disk by using the optical head to store it as learning disturbance information.
 - 15 2. An optical disk device according to claim 1, further comprising a focus mechanism control portion which controls a position of the objective lens mounted on the optical head based on a focus compensation gain, thereby controlling a focus of the laser light, wherein the position control portion determines and supplies the focus compensation gain to be supplied to the focus mechanism control portion based on a detection signal from the optical head, and the disturbance learning portion adjusts the focus compensation gain, and detects and stores disturbance information of the optical disk by using the optical
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head.

3. An optical disk device according to claim 1,
further comprising a tracking position control portion
which position-controls a position of the optical head
5 based on a tracking compensation gain according to
a target track,

wherein the disturbance learning portion adjusts
the tracking compensation gain, and detects and stores
disturbance information of the optical disk by using
10 the optical head.

4. An optical disk device according to claim 1,
wherein the position control portion further comprises:

15 a focus mechanism control portion which controls
a position of the objective lens mounted on the optical
head based on a focus compensation gain, thereby
controlling a focus of the laser light; and
20 a tracking position control portion which
position-controls a position of the optical head based
on a tracking compensation gain according to a target
track,

25 wherein the disturbance learning portion adjusts
the focus compensation gain and the tracking
compensation gain, and detects and stores disturbance
information of the optical disk by using the optical
head.

5. An optical disk device according to claim 1,
wherein the disturbance learning portion reduces the

compensation gain in a stepwise manner in a range in
which position control of at least one of the optical
head of the control portion and the objective lens
operates, and detects and stores disturbance
5 information of the optical disk by using the optical
head.

6. An optical disk device according to claim 1,
further comprising a phase adjuster which adjusts a
phase of the compensation gain according to a degree of
10 reduction when the disturbance learning portion reduces
the compensation gain of the position control portion.

7. An optical disk device according to claim 1,
wherein the disturbance learning portion carries out
learning of the disturbance when the optical disk
15 device does not carry out a recording process and
a reproduction process.

8. An optical disk device according to claim 1,
wherein the disturbance learning portion stores the
disturbance information according to a timing of an
20 output from an encoder coaxial to a spindle motor which
rotates the optical disk at a predetermined rotation
number.

9. An optical disk device according to claim 1,
wherein the disturbance learning portion has a detector
25 for detecting rotation information based on a signal
output from the optical head, and carries out learning
of the disturbance information at a timing given by

this rotation information.

10. An optical disk device according to claim 1,
wherein the disturbance learning portion also stores
the disturbance information of the optical disk in an
5 area corresponding to a predetermined rotation number
of the disturbance information.

11. An optical disk device according to claim 1,
further comprising a gain adjuster circuit which
receives a detection signal detected by the optical
10 head to obtain an average value thereof, and increases
or reduces the detection signal according to the
average value.

12. An optical disk device according to claim 1,
further comprising a gain adjuster circuit which
15 receives a detection signal detected by the optical
disk to obtain an average value thereof, increases the
detection signal when the average value is equal to or
smaller than a first predetermined value, and reduces
the detection signal when the average value is equal to
20 or greater than a second predetermined value in order
to avoid an effect caused by a difference in physical
characteristics between a recorded region and an
unrecorded region of the optical disk.

13. An optical disk device according to claim 1,
25 wherein the position control portion carries out
position control of at least one of the optical head
and the objective lens based on the learning

disturbance information stored by the disturbance learning portion.

14. An optical disk device according to claim 1,
wherein the position control portion controls the
5 optical head to be jumped with a timing determined
based on the learning disturbance information stored by
the disturbance learning portion when the optical head
is jumped to a target track.

10 15. An optical disk device according to claim 1,
wherein the position control portion controls a tilt of
the objective lens mounted on the optical head based on
the learning disturbance information stored by the
disturbance learning portion.

15 20 25. An optical disk device according to claim 1,
further comprising a learning disturbance comparison
circuit which, after the disturbance learning portion
has stored the learning disturbance information,
receives a positioning error signal based on a
detection signal from the optical head, and compares
a value of the positioning error signal with a value of
the learning disturbance information while carrying out
position control of at least one of the optical head
and the objective lens by the position control portion
based on the learning disturbance information,

wherein, in the case where the learning
disturbance comparison circuit determines that these
values are different from each other, the position

control portion determines that a non-constant disturbance exists in the optical disk, and carries out position control of at least one of the optical head and the objective lens based on only the learning 5 disturbance information.

17. An optical disk device, comprising:
an optical head which emits a laser light to an optical disk and receives a reflection light by using an objective lens, thereby carrying out one of 10 a recording process and a reproduction process;

a position control portion which carries out position control of at least one of the optical head and the objective lens according to a compensation gain based on a detection signal from the optical head;

15 a gain adjuster which adjusts the compensation gain of the position control portion; and

a phase adjuster which adjusts a phase of the compensation gain according to adjustment of the compensation gain of the gain adjuster.

18. A disturbance learning method for an optical 20 disk device, comprising:

carrying out position control of at least one of an optical head and an objective lens according to a compensation gain, based on a detection signal from the 25 optical head which emits a laser light to the optical disk and receives a reflection light by using the objective lens, thereby carrying out one of a recording

process and a reproduction process; and
adjusting the compensation gain in the position
control, and detecting disturbance information of the
optical disk by using the optical head to store it as
5 learning disturbance information.

19. A disturbance learning method for an optical
disk device according to claim 18, wherein a detection
signal detected by the optical head is received to
obtain an average value thereof, and the detection
10 signal is increased or reduced according the average
value.

20. A disturbance learning method for an optical
disk device according to claim 18, wherein the position
control portion carries out position control of at
15 least one of the optical head and the objective lens
based on the learning disturbance information.